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ABSTRACT

This series of newsletters and fact sheets provides information on the incidence of sport-related injuries in scholastic sports. The following topics are addressed: (1) how the National Athletic Trainers' Association (NATA) measures the number and severity of injuries; (2) facts about NATA; (3) injuries to high school football players; (4) conditions under which football injuries occur; (5) typical high school football injuries; (6) guidelines for parents of student athletes; and (7) a breakdown of time-loss injuries sustained in various parts of the body. (JD)

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National Athletic Trainers' Association, Inc.

1987 HIGH SCHOOL FOOTBALL INJURY SURVEILLANCE STUDIES

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NHSIR Methods: How NATA Measures Number and Severity of Injuries

(January 21, 1988--New York) The National High School Injury Registry (NHSIR) is a large scale data gathering mechanism concerned with sports-related injuries in six scholastic sports, primarily football and basketball.

It was designed in 1985 and first implemented in 1986 to enable on-site recorders to determine the risk of injury to secondary school students participating in interscholastic sports. The National Athletic Trainers' Association requested development of the NHSIR system to more clearly establish the risk of injury to high school athletes.

Skilled paramedical professionals are required to record injury-related data. During the 1987 football season, the NHSIR received data from 134 high schools that employ a full-time certified athletic trainer. The educational and clinical background of these professionals, which includes specific training in injury prevention and medical record-keeping, provided a high degree of reliability.

The sample of 134 schools is stratified geographically. It represents secondary schools of all sizes and nature (public and private) with 11-man football programs.

Injury data was recorded daily and submitted weekly to the NATA research team at San Diego State University. Numerical medical codes were provided for a common definition of injuries. Timely recording and processing helped keep summary tables up-to-date, enabled the research center to flag inconsistencies, and allowed time for verification.

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Information gathered included type of session (practice or game), type of injury, degree of injury, level of participation (varsity or junior varsity), the number of participants in each session and the type and condition of the surface on which teams were exposed. In addition, data included the date of injury and when players resumed participation, a clinical evaluation of the injury, the player's position, the situation at the time of injury, and the extent of the injury (new injury or re-injury, surgery or permanent disability).

To capture more routine variables that could be associated with risk, specific information was recorded for inclusion in the data analysis. These variables included players' height, weight, age, level of education, and years of football experience. Knowing these factors as they relate to injury allowed for the development of risk patterns associated with individual physical characteristics.

Maintaining the NHSIR system required considerable time and attention to detail on the part of on-site recorders. Certified athletic trainers who participated in the system were rewarded by the NATA with continuing education credits.

In June, 1988, the NATA will announce results of NHSIR findings pertaining to high school basketball injuries.

The NATA has approved funding for continuing research with the NHSIR system through the 1988-89 school year.

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NATA FACTS

I. The National Athletic Trainers' Association is a non-profit organization founded in 1950.

II. NATA membership has grown five-fold since 1972 to more than 10,000 members. The number of NATA-certified athletic trainers increased 12 percent in 1987 to nearly 6,000.

III. The NATA-certified athletic trainer is defined as:

> **"An allied health professional who has successfully completed the college/university undergraduate degree, fulfilled the requirements for certification of the National Athletic Trainers' Association, Inc., and has passed the NATA certification examination administered by the NATA Board of Certification."**

IV. The six domains of athletic training from which specific tasks are measured in the examination are:

1) Prevention of athletic injuries.
2) Recognition and evaluation of athletic injuries.
3) Management, treatment and disposition of athletic injuries.
4) Rehabilitation of athletic injuries.
5) Organization and administration of the athletic training program.
6) Education and counselling of athletes.

When practicing the art and science of athletic training, the certified athletic trainer works under the direction of a licensed physician.

V. The NATA earned full membership in the National Commission for Health Certifying Agencies in 1983. This accreditation provides the NATA with the right to set standards and evaluate and certify those seeking to become athletic trainers in the United States.

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VI. An "NATA-certified athletic trainer" is acknowledged by virtually everyone in the medical community as a highly qualified professional who has earned the title through a combination of college education and practical experience.

In 1987, more than 700 men and women were certified by the NATA, which equals the fastest rate of growth in one year since the NATA was founded in 1950.

NATA membership breaks down as follows:

NATA certified:	6,011
Associate members:	858
Student members:	2,657
Others (retired, allied, advisory, etc.):	550
TOTAL	10,076

Note: NATA membership has doubled since 1977.

VII. The players associations for the National Football League, Major League Baseball and the National Basketball Association require all athletic trainers coming into their league to be certified by the NATA.

VIII. The NATA executive director's primary role is to manage association business. Otho Davis, head athletic trainer for the NFL's Philadelphia Eagles, has served in this capacity since 1971.

IX. The NATA president presides over the Board of Directors and serves as spokesperson for the organization. Jerry Rhea, head athletic trainer for the NFL's Atlanta Falcons since 1969, was elected president by a majority of certified members and took office in June, 1986. The president's term of office is two years, and is limited to two consecutive terms.

X. The NATA divides the United States into 10 districts. The director for each district joins the executive director and the president to comprise the NATA Board of Directors.

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Picture Brightens; But Injuries To Prep Football Players Still At 37%

(January 21, 1988, New York)--For the second straight year, 37 percent of more than one million high school football players in the U.S. were sidelined by injury, the National Athletic Trainers' Association reported today.

Of the estimated 1,021,000 youngsters who played high school football during the 1987 season, 374,678 sustained at least one time-loss injury. The NATA projected national figures from its survey of 7,886 players at 134 high schools across the U.S.

When multiple injuries are included, the study indicates more than 516,000 football-related injuries occurred last year.

A five percent increase in major injuries, those that sideline a player for three weeks or more, belies an otherwise improving picture for high school football. The overall injury toll dropped 19 percent according to the survey, from 636,239 in 1986 to 516,716 last fall.

"We projected 21.7 percent fewer minor injuries, which accounted for most of the decrease," said NATA research director John W. Powell, Ph.D., an associate professor at San Diego State University.

Powell said the cyclical nature of injuries may account for part of the reduction, but cautioned that "real injuries" may not have decreased as much as the survey indicates.

"Results from the second year of similar studies we did in college and professional football also showed a

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decrease," Powell explained. "We have reason to believe it is more a reflection of record-keeping than a reduction of injuries. The actual injury toll is probably somewhere between what we projected last year and this year."

NATA executive director Otho Davis said another reason for fewer injuries may be that a growing number of coaches and school administrators are better informed today.

"Last year's survey, the first in-depth study ever done at the high school level, dispelled some myths and brought the injury issue into focus," said Davis, who is also head athletic trainer for the NFL's Philadelphia Eagles.

On balance, the 1987 study verified most of what was reported last year:

- o Sixty percent of all football-related injuries occurred in practice in 1987; 62 percent in 1986.
- o Sprains and strains accounted for 49 percent of the injuries in 1987; 49.5 percent in 1986.
- o Running backs remained at the highest risk of injury again in 1987 with 7.9 injuries per 100 games; quarterbacks were second, as in 1986, with 5.1 injuries per 100 games.
- o There were 13,612 football-related surgeries in 1987; 14,380 in 1986. Of all surgeries, 77 percent were knee-related in 1987; 69 percent in 1986.

"After examining the results of this second survey, I believe we can dismiss rumors circulating for some time that 40-to-50,000 knee surgeries occur each year in high school football," Powell said.

"Our projections, which are based on schools with certified athletic trainers, show an average of less than 9,300 knee surgeries per season across the country.

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That's about two knee surgeries for every three high school football programs," Powell said.

Powell cited what is perhaps the most significant concern about the NATA study. Nationwide projections are based on 134 schools with certified athletic trainers, college educated professionals who are trained to minimize the impact of injuries. Fewer than 15 percent of 20,000 U.S. high schools with athletic programs have certified trainers.

"We aren't able to say with certainty that schools without trainers have a higher incidence of injury," said the NATA's Davis. "But I think it's a logical assumption. We'll try to get a better handle on that in 1988."

Major injuries, like fractures and knee damage, incapacitated 57,241 prep football players in 1987, compared to 54,407 the previous year. Moderate injuries, which precluded participation for eight to 21 days, sidelined 86,028 players in 1987, compared to 104,959 a year earlier.

The typical American high school with a football program had 69 varsity and junior varsity players. Each school sustained, on average, 35 time-loss injuries in 1987, according to survey results. Of those, 25 were minor injuries, six were moderate and four were major injuries.

The NATA will conduct a third survey of high school football injuries during the 1988 season to identify what Powell calls "verifiable trends" and help establish guidelines for injury prevention programs.

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Study Shows 35 Football Injuries
Per School Under 'Good' Conditions

(January 21, 1988, New York)--Results of a study released today by the National Athletic Trainers' Association indicate more than 500,000 injuries occurred in high school football last fall.

The injury report reflects a ratio of one time-loss injury for every two prep football players in the U.S., an improvement over 1986 figures. But athletic trainers are concerned the injury situation may be worse than it appears.

"Injuries are an inevitable result of contact in most sports at any level," said Jerry Rhea, president of the NATA. "The good news from the 1987 study was the report of fewer injuries than in 1986.

"The flip side is that this study reflects only schools where certified trainers manage injury prevention programs. Eighty-five percent of high schools don't have a certified health care professional in their athletic program to treat and rehabilitate injuries," said Rhea, who is also head athletic trainer for the NFL's Atlanta Falcons.

An average of 35 football-related injuries occurred in 1987 at each of 14,836 U.S. high schools, according to the study. Of those, 25 were classified as minor injuries, six were moderate, and four were major injuries that precluded participation for three weeks or more.

"We recorded six fewer injuries per school in 1987 than in 1986," said John W. Powell, Ph.D., who directed the NATA study at San Diego State University. "That can be attributed in part to the cyclical nature of sports injuries, and perhaps to more accurate evaluation of injuries reported.

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"Unfortunately, we can't compare injuries at schools with athletic trainers to schools without them," Powell said. "Schools without certified trainers rarely keep record of all the sports-related injuries that occur."

Having supervised injury surveillance studies in college and professional football during the past decade, Powell said he is closer to arriving at "the irreducible number of football-related injuries" that occur each year.

"If the endemic level of risk associated with high school football is not 35 injuries per school, it may be 34 or 33," Powell said. "We should be able to establish more clearly what that number is after next year's study."

* * * * *

Powell and another researcher at San Diego State University, William H. Edwards, Ph.D., compared findings from the NATA's 1986 and 1987 football studies to a broad-based study of college football injuries conducted between 1975 and 1983. They based comparisons on game-related injuries per thousand exposures for varsity players only. Here's what they found:

- The risk of injury during practice is about the same in high school as in college.
- The risk of injury is four times higher in a game than in practice at the high school level; eight times higher in a game than in practice at college.
- Based on projections from their 1986 and 1987 studies, the average high school football program will experience about one surgery per year and, of those, two knee surgeries every three years. The average college football team will experience 2.5 knee surgeries per season.

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- Overall, despite the fact the average college football team plays only one more game (11) per year than the average high school team, the risk of sustaining a game-related injury is twice as great in college than in high school.

Don't be deceived by the comparison of injuries in high school to college, however, warned the NATA's Rhea.

"College athletes are getting some of the best health care in the country today," Rhea said. "We can't say the same for most high school kids, at least not yet."

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FACT SHEET

I. About the National High School Injury Registry

o The purpose of the NHSIR system is to determine the number and severity of "time-loss injuries" in high school football. The NATA's goal is to establish a strong foundation for estimating risks associated with high school athletics.

Definition: Time-loss injuries are defined in the NHSIR system as those that require the player to suspend activity for at least the remainder of the day the injury occurred, or the day after onset of injury.

By clearly identifying the problem, NATA officials feel they can help coaches, athletic directors, school superintendents and parents of high school athletes learn more about how to reduce sports-related injuries.

o NATA has developed and conducted the most comprehensive large scale study of high school athletic injuries to date. NATA officials describe the NHSIR study as "the first truly in-depth nationwide survey of sports-related injuries in U.S. high schools."

o NATA-certified athletic trainers monitored 7,886 football players at 134 schools in 1987 and 6,544 football players at 105 high schools in 1986. The research team was directed by John W. Powell, Ph.D, an associate professor at San Diego State University, with assistance from William H. Edwards, Ph.D. Dr. Powell, a certified athletic trainer, also supervises the National Football League Injury Surveillance program.

o There were 6,164 varsity players monitored in 1987 and 5,040 varsity players monitored in 1986. During the two years, 3,226 junior varsity players were monitored. The total number of high school football players monitored in both years was 14,430.

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II. U.S. Population of High School Football Players

- There are 14,836 high school football programs in the U.S.[1]

- There are 1,021,685 athletes participating in "11-man" high school football programs, or an average of 69 varsity and junior varsity football participants per U.S. high school.[2]

- There were 682,456 varsity football players in U.S. high schools during the 1987 season, based on average number of players per team (46) recorded in the National High School Injury Reporting (NHSIR) system. There were 339,229 junior varsity football players in 1987.

III. High School Football Injuries in 1987

- Of 7,886 players monitored in 1987, 2,892 (37 percent) were injured at least one time. The 1986 study also revealed that 37 percent of the players were sidelined by injury at least once during the season.

- On average, 35 football-related injuries occurred at each high school in 1987. The 1986 study showed an average of 41 injuries per school.

- Based on results of studies in both years, the typical high school football team can expect an average of 2.4 injuries per week during the course of the season.

- A total of 516,716 time-loss injuries occurred among a population of 1,021,685 high school football participants in 1987, based on projections of NHSIR system results (some players suffered more than one injury). The injury toll from among 1,048,100 football players in 1986 was 636,279.[3]

- There were no fatal or catastrophic (paralyzing/brain damage) injuries directly related to football among the 14,430 players monitored in NHSIR studies in 1986 or 1987. However, there is an average of 24 fatal or catastrophic injuries related to high school football each year, according to the "Annual Survey of Football Injury Research."[4]

IV. Comparing Practice Injuries to Game Injuries

- Sixty percent of all football-related injuries in 1987 were sustained during practice; 40 percent during games. The 1986 study indicated 62 percent of all reported injuries were suffered during a practice session.

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The NATA attributes the preponderance of practice-related injuries to frequency; high school players usually practice four times per week but play only once per week.

--52 percent of major injuries (out of action for three weeks or more) were sustained in practice in 1987, compared to 53 percent practice-related major injuries in 1986.

--44 percent of injuries that required surgery occurred in practice in 1987, compared to 43 percent in 1986.

--10.4 percent of all injuries reported in 1987 and 10.6 percent in 1986 were classified as "re-injuries" (to a previously injured body part). Of those, four percent were attributed directly to first-time injuries that occurred in the same season.

V. The Rate of Injury According to Position

The rate of injury by position was determined by calculating the rate of injury for each individual player at his position (see table below). Also included in the table is the rate of significant injuries (those that preclude football participation for more than seven days) per 100 games.

Game-related injuries--1987

Position	Injuries per 100 games	Significant injuries (7 days or more) per 100 games
Running back	7.9	2.6
Quarterback	5.1	1.8
Linebacker	3.0	1.0
Defensive Lineman	4.8	1.5
Tight End	3.2	0.6
Defensive Back	2.9	0.8
Offensive Lineman	2.5	0.9
Wide Receiver	2.9	0.9

*Source: National Athletic Trainers' Assn., Inc. (1987)

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VI. Most Common Causes of Injuries

- 47 percent of all reported injuries in 1987 and 44 percent in 1986 occurred as a result of "direct impact."

- 12 percent of all injuries in 1987 and 13 percent in 1986 resulted from stretched muscles.

- 12 percent of the injuries in 1987 and 11 percent in 1987 resulted from torsion or twisting of soft tissue.

- 9 percent of injuries in both years resulted from indirect force.

- 4 percent of injuries in both years were attributed to overuse.

VII. How Experience Affects Risk of Injury

- Years of high school football experience had little bearing on an athlete's frequency of injury:

  --Players with one full year of experience accounted for 25 percent of all reported injuries in 1987 and 28 percent in 1986.

  --Players with two full years of experience accounted for 32 percent of all reported injuries in 1987 and 31 percent in 1986.

  --Players with three full years experience accounted for 25 percent of all reported injuries in 1987 and 32 percent in 1986.

VIII. Additional Facts and Figures

- Based on both years of study, the average high school football player in the U.S. is 5'10" tall and weighs 170 pounds.

- 5,327 of the 14,430 players monitored in 1986 and 1987 were injured at least once. Of those, 26 weighed under 100 pounds and 33 weighed more than 280 pounds.

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- o Sixty-two percent of all injuries occurred during the regular season in 1987; 61 percent in 1986. Thirty-six percent of all injuries occurred in the pre-season in 1987; 37 percent in 1986. The balance of injuries occurred in post-season (playoff) competition.

- o No conclusions can be drawn from this study with regard to natural turf versus artificial turf since the use of artificial surfaces in high school sports is minimal. But for the record, 96 percent of the injuries occurred on natural turf.

IX. References

(1) The National Federation of State High School Associations (NFSHSA) reportedly represents 89 percent of U.S. high schools. The NFSHSA reports there are 13,204 "eleven-man" football programs among its members in its 1987-88 handbook (page 79). The NATA arrived at its total of 14,836 football programs in the U.S. by dividing 13,204 by .89.

(2) The National Federation of State High School Associations (NFSHSA) reportedly represents 89 percent of U.S. high schools. The NFSHSA lists a total of 909,300 football participants on "eleven-man" teams at their member schools. We arrived at a total of 1,021,685 high school football participants in the U.S. by dividing 909,300 by .89.

(3) The National Federation of State High School Associations (NFSHSA) reported there were 13,204 high schools with 11-man football teams in 1987, compared to 13,854 in 1986. NFSHSA attributed the drop to its improved record-keeping system in 1987, and advised the NATA the number of schools that actually dropped football was minimal.

(4) Fred Mueller, Ph.D., director of the **Annual Survey of Football Injury Research** at the University of North Carolina at Chapel Hill. Contact Dr. Mueller at 919/962-2021.

Please note: The NATA received funding for the NHSIR study from The Quaker Oats Company, maker of Gatorade® Thirst Quencher, and from the Athletic Products Division of Johnson & Johnson Products, Inc.

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SEVERITY OF HIGH SCHOOL FOOTBALL INJURIES

A breakdown of the 4,669 football-related injuries recorded by the National High School Injury Registry in 1987 follows:

Number of Injuries	Percent of total	Severity	Projected total of U.S. Population
3,373	(72.2%)	minor injuries that required seven days or less to heal before play was resumed.	373,447
778	(16.7%)	moderate injuries that precluded football participation for eight to 21 days.	86,028
518	(11.1%)	major injuries that precluded football participation for more than 21 days.	57,241
4,669	(100%)		516,716

* **Surgical repairs**: There were 123 football-related injuries (2.63 percent of total) that resulted in surgery in 1987. That projects to 13,612 football-related surgeries nationwide, or about one surgery per school. Seventy-eight of the 123 surgeries were knee-related (63 percent), which projects to 8,632 knee surgeries in high school football in 1987.

  NATA projected 14,380 surgical injuries in its 1986 study. Of those, 69 percent (or 9,933 surgeries) were knee-related.

* **Source**: National Athletic Trainers Assn., Inc. (1987)

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Parents' Tips
Protecting Your Child

In the October 5, 1987 issue of U.S. News and World Report magazine, writer Steven Findlay published recommendations for parents with youngsters who participate in sports. The recommendations are reprinted with permission of U.S. News and World Report.

If you're a parent, here are guidelines to help lower your child's risk of sports injuries:

* A child younger than age 6 shouldn't play competitive sports. Between 6 and 8, a child should be restricted to noncontact sports--swimming, tennis and track and field, for instance. At 8, competitive soccer is O.K. Ice hockey, tackle football and other "collision" sports shouldn't be allowed until 10.

* Does the team or program have a certified athletic trainer, exercise physiologist or specialist in athletic conditioning? If not, you may want to more carefully consider your child's participation.

* Check the exercise equipment supplied by the school or program--barbells, conditioning machines, stationary bikes, jump ropes and the like. Is it of good quality and relatively new? Are the kids instructed on its proper use?

* Ask your child about practice. If the kids do less than 20 minutes of warm-up and conditioning, talk to the coach.

* Check the protective gear supplied by the school for fit. Ill-fitting helmets and other equipment can promote injuries. If you have to buy equipment, ask the coach, athletic trainer or other sports specialist for recommendations about what's best.

* See if the school or program has access to a hospital or clinic where kids can be brought and treated immediately if they're injured seriously. If your child is injured, ask how the injury was treated. And don't let your child play hurt.

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* Encourage your child to be active in other areas, such as biking or swimming, that build stamina and strength. It can help to ward off injuries.

* Take your child for a full physical examination before allowing him or her to play any organized sport.

* Don't let an overtired child practice or play in a game. Fatigue raises the risk of injuries.

U.S. News & World Report

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WHERE IT HURTS

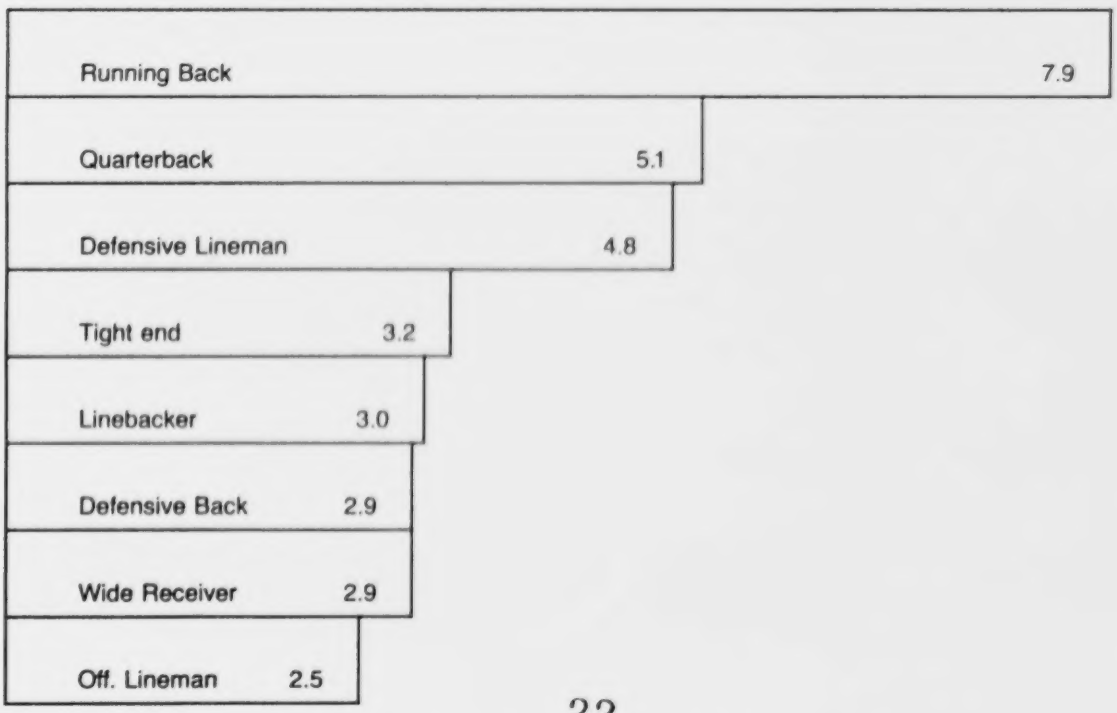
A breakdown of 4,669 time-loss injuries reported in the NHSIR study and projections of U.S. totals follow:

Number of injuries reported in study	Location	Percentage of total	Projected total of high school football injuries in U.S.
796	hip/thigh	(17.0%)	88,093
733	ankle/foot	(15.7%)	81,121
710	forearm/wrist/hand	(15.2%)	78,574
661	knee	(14.2%)	73,153
476	trunk	(10.2%)	52,679
514	shoulder/arm	(11.0%)	56,884
463	head/neck/spine	(9.9%)	51,240
107	face/scalp	(2.3%)	11,842
209	other	(4.5%)	23,130
4,669	time-loss injuries	100%	516,716

*Source: National Athletic Trainers' Assn., Inc. (1987)

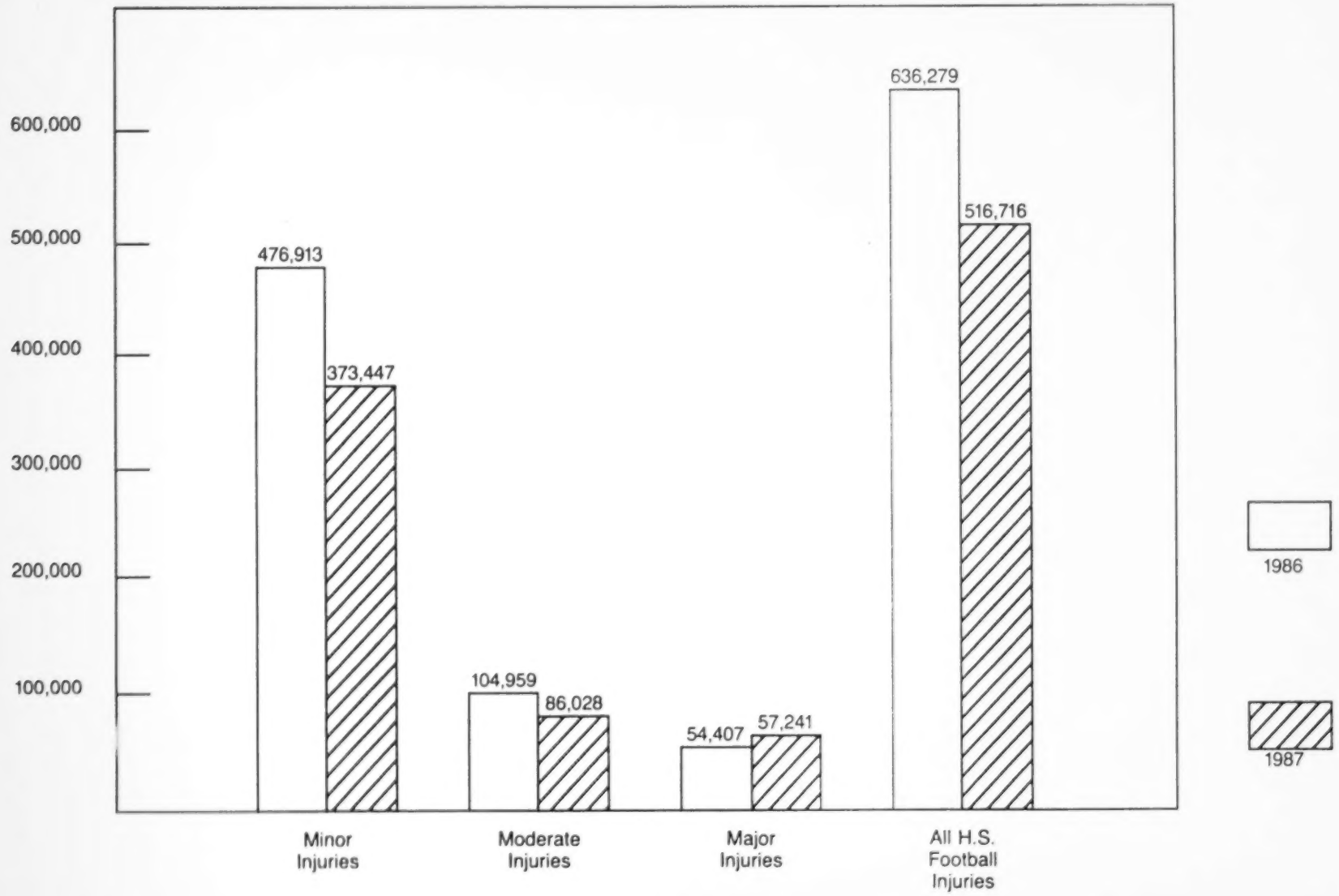
WHEN PLAYERS GET HURT 1986-87

INJURIES BY POSITION (per 100 games) IN 1987



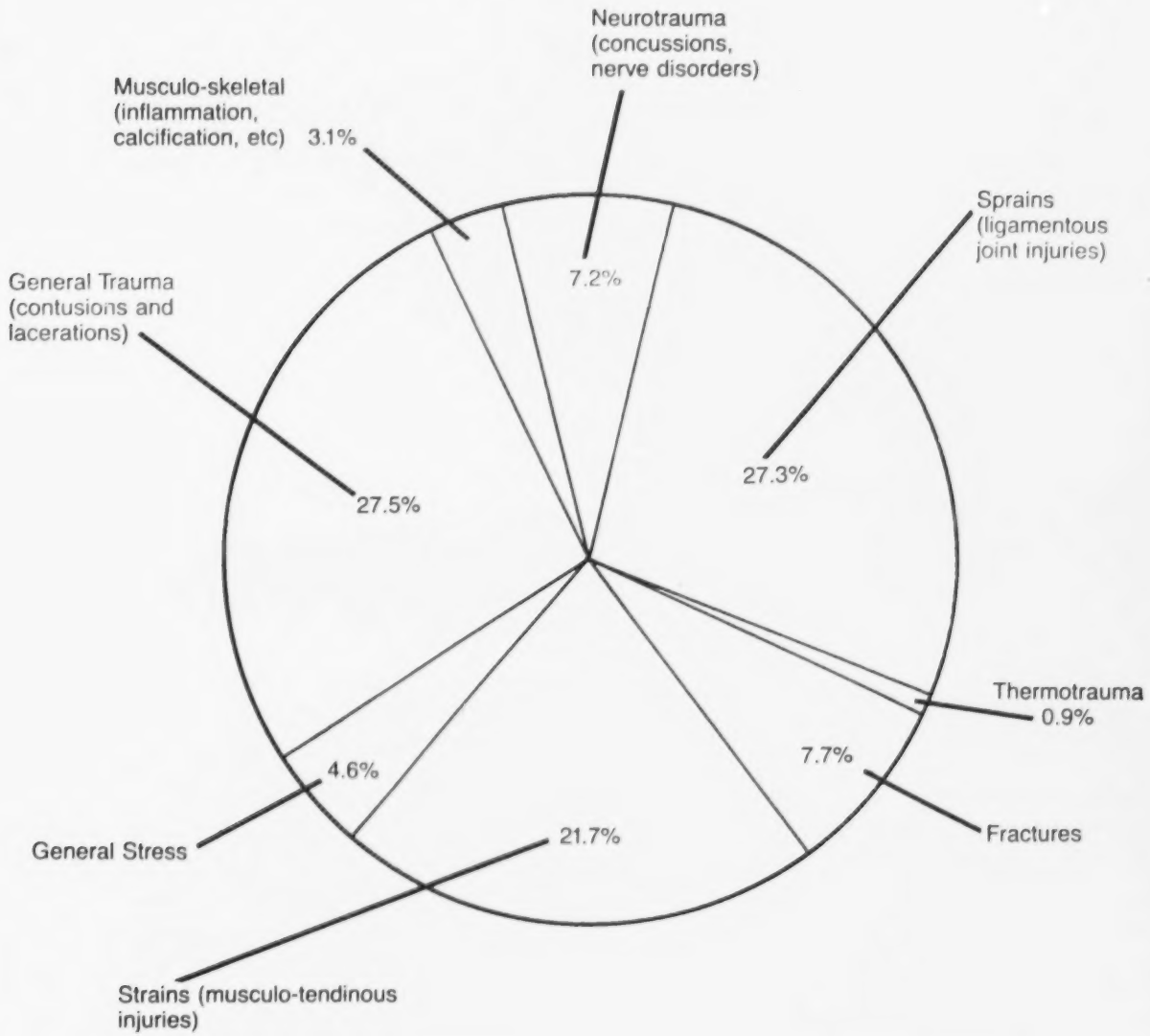
Source: National Athletic Trainers' Association, Inc (1987)

COMPARING HIGH SCHOOL FOOTBALL INJURIES: 1986 vs. 1987



Source: National Athletic Trainers' Association, Inc (1987)

TYPES OF INJURIES SUSTAINED IN HIGH SCHOOL FOOTBALL IN 1987



Source: National Athletic Trainers' Association, Inc (1987)